**Office of Resource Conservation**
**State of Illinois**
**Grant Proposal**

**Project Number: T-106-R-1**

**Project Title:**

Assessing the Status of Potential Illinois Endangered and Threatened Fish Species

**Need:**

About 6% of Lake Michigan is in Illinois, forming one of the largest ecosystems within the state. It serves as a source of drinking water for millions of people in the Chicago area. Thousands visit its beaches every year, fish its waters, boat from the many harbors, or live along its shores. Commercial shipping is a critical component of the regional economy. Lake Michigan is one of the most significant natural resources within Illinois.

As a consequence of millions of people utilizing Lake Michigan, it is under pressure from invasive species, urban development, fluctuating water levels, legacy of past commercial fishing exploitation, pollution, and the possibility of offshore wind farms. People are aware of these issues and there is interest in doing something about them. For example, there has been a recent increase in habitat restoration activities and incorporating environmental considerations into anti-erosion projects all along the Illinois lakefront. If we are to successfully judge our ability to restore habitats or alleviate other anthropogenic pressures, then we need to understand key components of the ecosystem's biodiversity, such as Lake Michigan fishes.

People are certainly aware of fishes in Lake Michigan, but most of the attention is on sport fishes, like salmon, yellow perch, and basses, which are important in their own right. However, these are relatively larger fishes, and the gear used to sample them tends to be specific for bigger fishes, overlooking smaller less-common fishes. It has become apparent in recent discussions with the Illinois Endangered Species Protection Board that many fishes in Lake Michigan are data-deficient, making it difficult to arrive at informative listing decisions. Many taxa that we do have more information about are considered Species in Greatest Need of Conservation. Combine this with the urbanized nature of Chicago's shoreline, and we are in desperate need of information on the status and habitat characteristics of less-common Lake Michigan fishes.

The presence or absence of Species in Greatest Need of Conservation can often reveal ecosystem health. It is critical that state listings for these species are accurate because a flawed assessment could lead to species decline beyond hope of recovery, and because of the serious economic and management repercussions of listing a species.

**Purpose and Objectives:**

The project's principal investigator is Dr. Philip Willink, Senior Research Biologist at Shedd Aquarium's Daniel P. Haerther Center for Conservation and Research. Dr. Willink will investigate the current status of potential endangered and threatened fishes in northern Illinois, which will assist the Illinois Endangered Species Protection Board and the Illinois Department of Natural Resources in updating its endangered and threatened fish species list, will help determine the efficacy of existing management programs and will identify the current distribution of potentially rare fish species.

Project objectives:

1.) Examine and summarize existing assessment and museum collections data on selected rare fish species;
2.) Identify populations that are lacking current data and develop a sampling plan to revisit historic sampling locations;
3.) Conduct fieldwork to assess the status of populations for which there are no current data;
4.) Provide population status update report to the Illinois Department of Natural Resources to inform management decisions.

To better inform future listings, we will review historical records and conduct targeted field surveys to account for distribution gaps. Our approach builds upon traditional survey methods as we are looking at the historical trends of species distribution through time. Analysis of historical trends will be by watershed or another appropriate geographic unit because different populations within a species could very well be experiencing different threats in different areas.

**Expected Results or Benefits:**

Our initial data from limited surveys suggest that some species are declining, others are stable and some are improving. The overall picture is complicated, even within a single species or among watersheds. For example, the Lake Michigan population of Banded Killifish appears to be stable or increasing, the Calumet / Des Plaines population has increased dramatically, but the Fox population is declining precipitously. There is not necessarily a single story for each species. Instead, the status of a given species may vary by watershed, and may be under pressure from different stressors in different areas. It is critical to compile historical locality data and supplement it with present-day surveys to determine population trends over time if we are to untangle the status of our Species in Greatest Need of Conservation.

The primary measure of success is the project's influence on policy, such as listing as Endangered or Threatened. This is difficult to determine at the state level, since one never knows how many regulatory questions will come up that pertain to fishes. But the scientific data provided by this study will be available to decision makers.

A secondary measure of success is the applicability of results for habitat restoration projects. This could be quantified by the number of projects that incorporate the results. Related to this would be the applicability of findings for natural resource managers: Do they include the findings into adaptive management plans of property they manage, but are not actively restoring

at this time? Potential restoration sites along the Lake Michigan lakefront in Illinois include Northerly Island, 63rd Street Beach, Diversey Harbor and Waukegan Harbor.

A final measure of success is the number of publications and public presentations that result from this work.

**Approach:**

Dr. Willink will compile historical locality data from scientific literature (e.g., fishery reports, ecological monographs, watershed biodiversity reviews), museum records (e.g., Illinois Natural History Survey, Field Museum of Natural History, Southern Illinois University-Carbondale, University of Michigan) and state and federal natural history databases (e.g., Illinois Department of Natural Resources, U.S. Army Corps of Engineers, Environmental Protection Agency, U.S. Fish and Wildlife). This provides baseline data for the project. If a species has been found at a given locality within the past several years, the information will be noted. If a species has not been found at a given locality within the past several years, then we will visit the site and survey the fishes to determine if the species is present or absent. We will also survey other non-historical sites that are believed to have suitable habitat to document presence or absence.

At each site, records will be taken of the physical conditions of the creek, river, pond, or lake. All fishes will be identified and recorded, enabling us to comment on the fish community. Survey methods will vary depending upon site conditions. Shallow water sites usually include seining, backpack electrofishing or fish traps. Offshore sites will utilize traps and nets set on the bottom. All fishes will be returned immediately to the water, although pictures are sometimes taken to verify identifications.

Candidate species and habitats include:

- Rosyface Shiner *Notropis rubellus* and Carmine Shiner *Notropis percobromus* (Were considered one species, but recently split into two. Both species are supposed to be in Illinois, but we do not know their exact distribution at this time.)
- Mottled Sculpin *Cottus bairdii* (both subspecies)
- Slimy Sculpin *Cottus cognatus*
- Spoonhead Sculpin *Cottus ricei*
- Deepwater Sculpin *Myoxocephalus thompsonii*
- Bloater *Coregonus hoyi*
- Lake Chub *Couesius plumbeus*
- Ozark Minnow *Notropis nubilus*
- Longnose Dace *Rhinichthys cataractae*
- Lake Sturgeon *Acipenser fulvescens*
- Banded Killifish *Fundulus diaphanus*

Part of the emphasis here is to study fishes that nobody else has paid enough attention to, but are or potentially could become Species in Greatest Need of Conservation.

Areas of particular interest are the coastal zone and the deeper waters of Lake Michigan. This is the portion of Illinois that we have the least amount of data, and understand the poorest. But

some species found in Lake Michigan are also distributed through the inland waters of Illinois (e.g., Mottled Sculpin and Banded Killifish). Although we will conduct fieldwork throughout northern Illinois to provide the appropriate context, we will pay particular attention to Lake Michigan.

We plan to work with organizations that have resources that contribute to the project and/or benefit from project findings. These include:

- Illinois Endangered Species Protection Board
- Illinois Department of Natural Resources
- U.S. Army Corps of Engineers
- Illinois Natural History Survey
- Loyola University

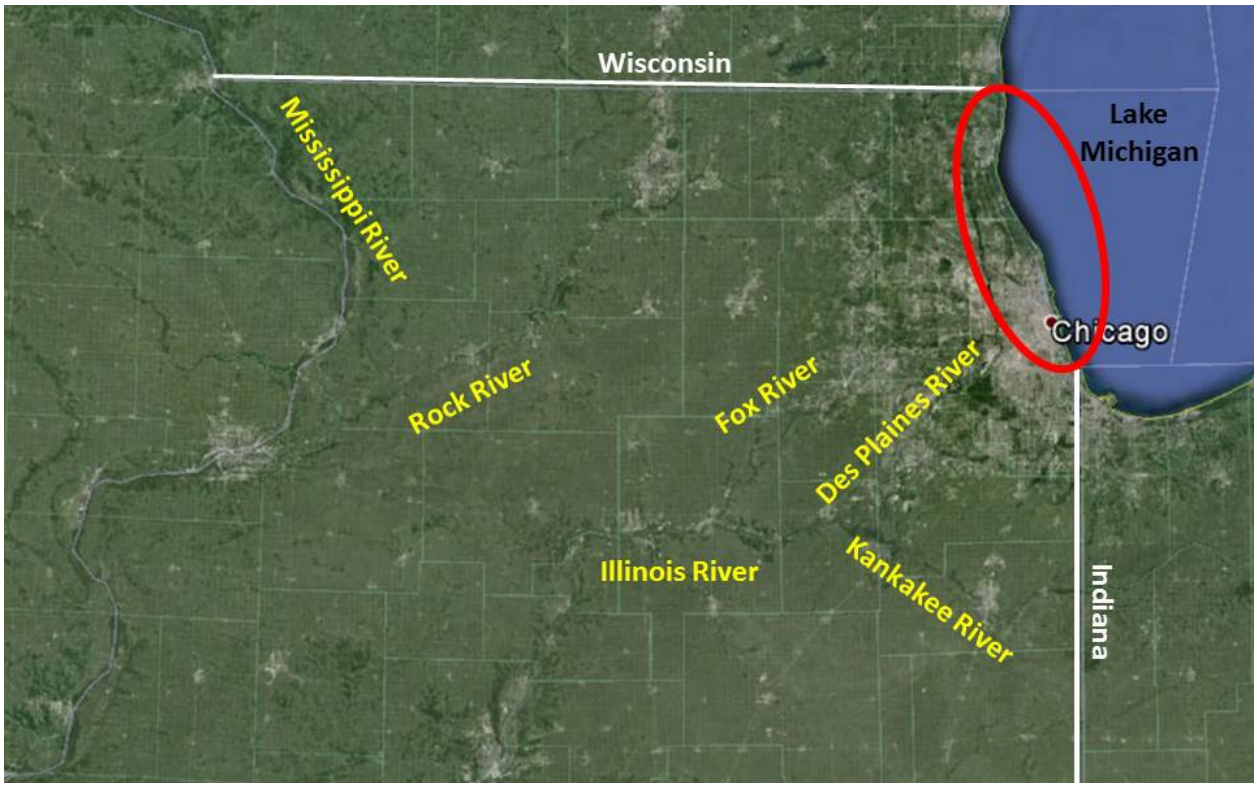
The Illinois Endangered Species Protection Board is keenly interested in acquiring additional and current data to make the wisest decisions possible. The Illinois Department of Natural Resources issues permits, and has offered to support fieldwork. The U.S. Army Corps of Engineers has also offered to help with fieldwork, as this benefits a number of their ongoing habitat restoration activities. The Illinois Natural History Survey holds the premier preserved Illinois fish collection and conducts annual sampling out of their Lake Michigan Biological Station in Zion, IL.

**Useful Life:**

Not applicable.

**Geographic Location:**

The emphasis of the project is on Lake Michigan, but will include northern Illinois because some fish species have ranges extending over the entire area. Principal watersheds to be covered in northern Illinois will be the Des Plaines, Kankakee, upper Illinois, Fox, and Rock.




**Principle Investigator:**

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**Program Income:**

Not applicable.

**Budget Narrative:**

Non-federal funds are coming from Shedd Aquarium and/or potential individual or foundation donors.

Majority of the budget is salary and fringe for Dr. Philip Willink.

Note that Shedd Aquarium already has some field supplies (e.g., dipnets, seines, etc.) that can be used for shallow water sampling. Travel costs for sites near Chicago are negligible, so they are not included in the budget.

Materials and Supplies budget:

| Materials and Supplies | Cost |
|---|---|
| | |
| Nets | $500 |
| Minnow traps (30 x $10/each) | $300 |
| Fish (large) traps (10 x $30/each) | $300 |
| Large buoys (5 x $50/each) | $250 |
| Small buoys (40 x $5/each) | $200 |
| Rope | $180 |
| Waders (4 x $75/each) | $300 |
| Full-body survival suit (2 x $400/each) | $800 |
| Life preservers (5 x $30/each) | $150 |
| | |
| Total = | $2,980 |

Travel and Other budget:
(All expenses are in-state.)

| | Nov | Feb | Apr | May | Jun | Jul | Aug | |
|---|---|---|---|---|---|---|---|---|
| Travel | | | | | | | | Totals |
| Lodging ($75/night) | | 150 | 150 | 150 | 150 | 150 | 150 | 900 |
| Meals | 30 | 60 | 90 | 90 | 90 | 90 | 90 | 540 |
| | | | | | | | | subtotal = 1,440 |
| Other | | | | | | | | |
| Gas | 30 | 60 | 100 | 100 | 100 | 100 | 100 | 590 |
| Registration | | 170 | | | | | | 170 |
| | | | | | | | | subtotal = 760 |
| Contractual Services | | | | | | | | |
| Car rental ($40/day) | 40 | 160 | 160 | 160 | 160 | 160 | 160 | 1000 |
| Boat rental ($500/day) | | | 1500 | 1500 | 1500 | 1500 | 1000 | 7000 |
| | | | | | | | | subtotal = 8,000 |

November 2015 travel costs are for attending Illinois Endangered Species Protection Board meeting that will discuss changes to endangered and threatened listings of fishes. Location has not been determined, but it is in Illinois. One day of travel.

February 2016 is the Illinois Chapter meeting of the American Fisheries Society. It will be held in Springfield, IL, and lasts for three days / two nights. It is the primary meeting of fish professionals within Illinois.

Monthly costs for April 2016 to August 2016 are for in-state fieldwork.

**Multipurpose Projects:**

Not applicable.

**Relationship with other Grants:**

Dr. Willink has submitted a proposal to the Illinois Department of Natural Resources – Coastal Management Program titled 'Shedd Aquarium's Biological Survey of Morgan Shoal, Chicago'. The project intends to survey the flora and fauna of a rock outcrop in Lake Michigan off the coast of Chicago in 2015. The shoal itself is at most one square mile in size, so the inventory is in a limited area. Data from this project can be used to provide background info and supplement the efforts of this State Wildlife Grant proposal.

**Timeline:**

Table 1. Summary timeline for this project's objectives with shading indicating when objectives will be accomplished.

| | 2015 | | | 2016 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Objective | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep |
| 1.Compile historical data | | | | | | | | | | | | |
| 2. Identify data gaps | | | | | | | | | | | | |
| 3. Fieldwork | | | | | | | | | | | | |
| 4. Interim species reports | | | | | | | | | | | | |
| 4. Prepare final report | | | | | | | | | | | | |

October 2015 to November 2015
Conduct preliminary fieldwork when weather conditions permit. When weather conditions do not permit, begin compiling historical data from literature and databases.

December 2015 to March 2016
Compile historical data from literature and databases. Perform gap analysis to determine where fieldwork should be focused in the upcoming field season. Write interim species reports. For those rare species that are unlikely to have significant amounts of additional data from the 2016 field season, like Lake Sturgeon and Spoonhead Sculpin, the interim reports will become their final reports.

April 2016 to August 2016
Emphasis on fieldwork to fill geographic gaps or update records from surveys that were conducted many years ago.

September 2016
Compile and package data for Illinois Department of Natural Resources. Finish project report that details the status, historic population trends, habitat requirements, etc. for the Species in Greatest Need of Conservation. This important information will be compiled into a single document composed of a series of species reports. The format of the species report will be based on a template currently being developed by Illinois Department of Natural Resources.

**Compliance:**

All planned activities will be in compliance with the Endangered Species Act. All determinations and documentation will be in accordance with the current established U.S. Fish and Wildlife Service protocols for section 7.

Relative to other Federal compliance requirements, this project does not:

- involve land disturbing activities (CERP certification for NEPA);
- affect areas covered by Section 106 of the National Historic Preservation Act;
- occur on a floodplain or wetland (Executive Orders 11988 and 11990);
- involve site improvement or access that may be subject to Section 504 of the Rehabilitation Act and the Americans with Disabilities Act;
- involve the use of pesticides, herbicides, or other comparable chemicals; or
- acquire land (Uniform Relocation Assistance and Real Property Acquisition Policies Act).

An Illinois state collecting permit and endangered species permit will be required for the fieldwork. Dr. Philip Willink currently holds both permits for 2015, and will need to renew them for 2016. (This is standard procedure for all Illinois permit holders.) He has held and consecutively renewed these permits for a number of years.

None of the species of interest are federally listed under U.S. Fish and Wildlife Service's Endangered Species Act.

## PROJECT BUDGET

Project Title: Assessing the Status of Potential Illinois Endangered and Threatened Fish Species

Project Number: T-106-R-1

Project Time Frame: Start Date - (10\1\2015); End Date - (9\30\2016)

| Budget Categories | Federal Funds | Non-Federal Funds | Project Totals |
|---|---|---|---|
| Salaries and Wages | $32,828 | $16,205 | $49,033 |
| Fringe Benefits | $9,850 | $4,860 | $14,710 |
| Travel | $800 | $640 | $1,440 |
| Equipment | $0 | $0 | $0 |
| Materials and Supplies | $1,656 | $1,324 | $2,980 |
| Contractual Services | $4,444 | $3,556 | $8,000 |
| Other | $422 | $338 | $760 |
| Total Direct Costs | $50,000 | $26,923 | $76,923 |
| Modified Total Direct Cost (MTDC) | $50,000 | $26,923 | $76,923 |
| Indirect Rate of 20% | | | $0 |
| Indirect Rate of ____ .__ % | | $0 | $0 |
| Unrecovered Indirect Rate | | $0 | $0 |
| Total Project Costs | $50,000 | $26,923 | $76,923 |
| Percentage of Total Project Cost | 65% | 35% | 100% |